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- (57) Claim

1. A portable fume cabinet comprising a work area upon which a work operation can be performed, and a fume extraction system for extracting fumes or contaminated air arising from operations performed on the work surface wherein the inlet means of the fume extraction system is located in close proximity to the work area such that fumes arising from the operation performed on the work area are substantially drawn into the inlet means in a more or less direct flow path without substantially filling the working space of the fume cabinet or substantially diverging from the more or less direct flow path between the work area and the inlet means.

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COMPLETE SPECIFICATION
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Invention Title: PORTABLE FUME CABINET

Name of Applicant: HARVARD SURGICAL PTY LTD

The following statement is a full description of this invention, including the best method of performing it known to me/us:

PORTABLE FUME CABINET

The present invention relates generally to a portable fume cabinet and in particular to a portable fume cabinet adapted for use in sterile environments or the like. More particularly, the present invention relates to a portable fume cabinet for use in operating theatres of hospitals or similar environments. Even more particularly, the present invention relates to a portable fume cabinet having a more efficient fume extraction system in which the intake vents or inlets are located in closer proximity to the source of the fumes or other contaminants. The present invention finds particular application as a self contained, portable, fume cabinet for use in operating theatres which permits more efficient extraction of fumes so that the staff of the operating theatre are not exposed to the fumes produced from the sterilising solutions or at least suffer reduced exposure to such fumes.

Although the present invention will be described with particular reference to a portable fume cabinet for use in operating theatres it is to be noted that the present invention is not limited in scope to the described embodiment but rather the scope of the present invention is more extensive so as to include other arrangements of the fume cabinet and to the use of the fume cabinet in other applications.

One problem with existing fume cabinets is that the extraction vents, ducts or inlets for extracting fumes or contaminated air are located remote from the work area inside the cabinet so that when an attendant is working at or in the fume cabinet fumes flow past the head of the attendant on their way from the work area to the extraction vent. Usually, the extraction vent or vents are located at the top of the fume cabinet so that fumes are drawn from the work surface in front of the attendant up through the

space of the fume cabinet in which the head of the attendant is located and into the extraction system. This arrangement to some extent defeats the purpose of having the fume cabinet as the attendant is exposed to the fumes when working at or in the cabinet. Therefore, there is a need to provide a fume cabinet which is provided with a more efficient extraction system.

Another problem associated with existing fume cabinets is that the fume extraction system is usually located at the top of the fume cabinet which arrangement requires a supporting structure. The supporting structure in many cases obscures view of the work area unless the fume cabinet is made so large that the supporting structure is above the height of the head of the attendant, which presents further problems of being able to transport the fume cabinet through doorways and the like. Most often, the supporting structure is concealed within the top of the fume cabinet which is opaque thus resulting in less of vision from some angles or viewing of the inside of the cabinet being obscured from some angles.

Another problem associated with previously used fume cabinets is that such fume cabinets have been provided with a flat working surface or area. If it is desired to contain liquids, such as sterilising liquids, trays, dishes or the like must be used to retain the sterilising liquid. The trays are placed on the work surface of the fume cabinet. As the trays are merely placed on the work surface there is a possibility that the trays can be dislodged from the work surface thereby spilling the contents onto the floor of the operating theatre which not only necessitates the spillage having to be cleaned but also the instruments that were formerly sterilised in the tray now have to be re-sterilised, which can disrupt the operating procedure.

Additionally, existing fume cabinets are not provided with drainage systems so that attendants are required to carry trays more or less full of spent sterilising solution from the fume cabinet so a suitable disposal area, such as a trough, sink or the like. Due to the trays being carried, there is a chance that the solution may be spilt.

Additionally, the attendant carrying the open top trays is exposed to the fumes from the solution in the trays.

Therefore, there is a need to have a fume cabinet provided with a container arrangement in which the containers are more securely located, and which reduces the chances of the sterilising liquid being spilt, as well as minimising the chances of exposure to the fumes of the sterilising solution, particularly when old sterilising solution is being disposed.

Accordingly, there is a need for a fume cabinet which overcomes at least the problems of drawing fumes or contaminated air past the head of an attendant working at or in the cabinet. Additionally, there is a need to provide a fume cabinet having better visibility of the working area within the cabinet and to provide a fume cabinet having a safer working environment for the attendant whilst working at or in the fume cabinet.

Therefore, it is an aim of the present invention to provide a fume cabinet which at least in part overcomes at least one of the problems mentioned above.

According to the present invention there is provided a portable fume cabinet comprising a work area upon which a work operation can be performed, and a fume extraction system for extracting fumes or contaminated air arising from operations performed on the work surface wherein the inlet means of the fume extraction system is located in close proximity to the work area such that fumes arising from the operation performed on the work area are

substantially drawn into the inlet means in a more or less direct flow path without substantially filling the working space of the fume cabinet or substantially diverging from the more or less direct flow path between the work area and the inlet means.

Typically, the fume cabinet of the present invention is a self contained fume cabinet requiring no outside fume extraction system. More typically, the fume cabinet is provided with an electric power lead. Even more typically, the fume cabinet is provided with a waste drain or similar. The fume cabinet is provided with means, such as castors or similar, so that the cabinet is mobile.

Typically, the work surface of the fume cabinet is one or more dishes, troughs, sinks or the like for containing sterilising solution such as for example CIDEX, glutar aldehyde, and the like.

More typically, the sinks are integrally formed as part of the work surface. More typically, one of the sinks is provided with an outlet and drain forming a drainage system for draining spent sterilising fluid.

Typically, the fume extraction system comprises an inlet duct or vent for admitting fumes produced by performing work operations in or on the work area, a motor and fan arrangement for conveying fumes through the extraction system and a filter arrangement for extracting contaminants and fumes from the air and an outlet duct for discharging air free of fumes or contaminants. More typically, the inlet ducts or vents are located in close proximity to the sinks. Even more typically, the inlet vent or vents of the fume extraction system are located along the top edge or surface of the work area such that the flow path of the fumes arising from work operations conducted in the sinks is as short and direct as possible.

Typically, the filtered air from which the contaminating fumes have been extracted is released to atmosphere through an exhaust duct or outlet located at the base of the fume cabinet. More typically, the exhaust duct is movable so
5 that it can adopt the most convenient position to discharge the filtered air.

The present invention will now be described by way of example with reference to the accompanying drawings which illustrate one embodiment of the present invention and in
10 which:

Figure 1 is a top front perspective view of one form of the fume cabinet of the present invention, and
Figure 2 is a vertical cross-sectional view taken through
the embodiment of figure 1.

15 In figures 1 and 2 there is shown a portable, generally self-contained mobile fume cabinet generally denoted as 2. Fume cabinet 2 is provided with a generally rectilinear opaque base portion 4 forming the lower part of the cabinet 2. Base 4 is provided with four castors 6 located at the
20 lower in use corners of cabinet 2. Castors 6 may be of any convenient, suitable or desirable form and optionally includes locking means for securely anchoring fume cabinet 2 in position. Castors 6 also provide for a space between the lowermost portion of base 4 and the floor upon which
25 the cabinet stands to allow discharge of filtered air.

A door 8 is provided in the front surface of base part 4 and is hingedly connected to the front forward edge 7 of base portion 4 in such a manner to allow door 8 to swing downwardly enabling access into the base portion 4 to be
30 gained. Door 8 is provided with handle 9 and the front mid-portion 10 of cabinet 2 is provided with a meter, gauge or similar to provide an indication of the amount of time that the cabinet has been used to provide information about the filtering system and when to replace the filters.

The upper portion 20 of fume cabinet 2 comprises a generally rectilinear cover arrangement having a rear opaque wall portion 11, an opaque top portion 12, two opaque side portions 13,14, and a clear window 15 and clear door 16 angularly inclined to each other at the front of the top cover 20. Clear window 15 and clear door 16 are generally made of a transparent plastics material, such as perspex or similar. Top portion 12 spans between the upper in use edges of sides 13,14 while clear windows 15 and door 16 extend between the front edges of sides 13,14. Window 15 is fixed and extends between the two side portions 13,14 along the forward facing edge of top portion 12. Window 15 allows work operations being performed inside fume cabinet 2 to be viewed from outside the fume cabinet. The forwardly facing lower edge 17 of window 15 is provided with a pair of hinges 18 for hingedly connecting door 16 to fixed window 15 for allowing access to the inside of the top part 20 of fume cabinet 2. Door 16 is provided with a handle 19 and with sealing means (not shown) around its periphery for sealing engagement with the sides 13,14 of fume cabinet 2 to prevent escape of fumes.

Inside fume cabinet 2 is provided a work surface or area comprising a pair of sinks 42, 44 in which sterilising solution may be contained for sterilising instruments during an operation. Sink 42 is provided with a drainage outlet 46 and a drain pipe 48 for discharging spent sterilising fluid from sink 44.

Fume cabinet 2 is provided with a fume extraction system for directly extracting fumes from the pair of sinks 42,44. The fume extraction system comprises an inlet means in the form of a vent arrangement 50 consisting of one or more vents 52 extending almost the entire width of fume cabinet 2 located immediately above the top of sinks 42,44 along their respective rear top edges. Vents 52 are connected to duct 54 and are in fluid communication therewith. A motor

56 and fan 58 together with a suitable filter arrangement (not shown) are provided in duct 54. The lowermost portion of duct 54 is provided with outlet 60 located at the bottom of fume cabinet 2. The position of outlet 60 is adjustable by outlet duct 60 being able to swivel or otherwise move to adopt a suitable position to allow air free of fumes or contaminants to be discharged into the operating theatre at a convenient position.

In operation of the fume cabinet 2 of the present invention fumes arising from conducting a work operation in the fume cabinet 2, such as for example, sterilising instruments in sinks 42,44, are drawn into vents 52 and through duct work 54 by rotation of fan 58 driven by motor 56 to the filter arrangement (not shown) whereby any contaminants or fumes in the air being conveyed through the duct work 54 are absorbed into the filter system and extracted from the air so that air uncontaminated with fumes or other particles or contaminants can be discharged through outlet 60.

By arranging the inlet vents 52 in very close proximity to the source of the fumes an attendant working in or at the fume cabinet, particularly over sinks 42 and 44, is not subjected to fumes flowing past their head as any fumes produced are immediately drawn into inlet 50 for treatment as previously described, and thus the flow path between the source of fumes and the inlet 50 is minimised

THE CLAIMS DEFINING THE PRESENT INVENTION ARE AS FOLLOWS:

1. A portable fume cabinet comprising a work area upon which a work operation can be performed, and a fume extraction system for extracting fumes or contaminated air arising from operations performed on the work surface wherein the inlet means of the fume extraction system is located in close proximity to the work area such that fumes arising from the operation performed on the work area are substantially drawn into the inlet means in a more or less direct flow path without substantially filling the working space of the fume cabinet or substantially diverging from the more or less direct flow path between the work area and the inlet means.
2. A portable fume cabinet according to claim 1 in which the fume extraction system comprises an inlet duct or vent for admitting fumes produced by performing work operations in or on the work area, a motor and fan arrangement for conveying fumes through the extraction system and a filter arrangement for extracting contaminants and fumes from the air and an outlet duct for discharging air free of fumes or contaminants.
3. A portable fume cabinet according to claim 2 in which the inlet vent or vents of the fume extraction system are located along the top edge or surface of the work area such that the flow path of the fumes arising from work operations conducted in the sinks is as short and direct as possible.

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ABSTRACT

5 A mobile fume cabinet (2) is provided having a sink (42,44) for containing a liquid and a fume extraction system in which the inlet vent (50,52) is located in close proximity to the sink so that fumes arising from the liquid in the sink are admitted into the vent (50,52) in a short and direct pathway. The sink is also provided with a drainage system for discharging spent fluid.

67308/94

FIG. 1



